NON-PUBLIC?: N
ACCESSION #: 9503310040
LICENSEE EVENT REPORT (LER)

FACILITY NAME: DONALD C. COOK NUCLEAR PLANT - UNIT 2 PAGE: 1 OF 4

DOCKET NUMBER: 05000316

TITLE: REACTOR TRIP FROM LOOP-4 STEAM FLOW/FEED FLOW MISMATCH COINCIDENT WITH A LOW LEVEL IN NO. 4 STEAM GENERATOR
EVENT DATE: 02/23/95 LER #: 95-002-00 REPORT DATE: 03-27-95

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION:
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: G. A. WEBER - PLANT ENGINEERING
SUPERINTENDENT TELEPHONE: (616) 465-5901

COMPONENT FAILURE DESCRIPTION:
CAUSE: X SYSTEM: JB COMPONENT: FC MANUFACTURER: T040
REPORTABLE NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On February 23, 1995, at 1645 hours with Unit 2 in Mode 1 (Power Operation) at 100 percent Rated Thermal Power, a Reactor Trip occurred from a steam flow/steam feed flow mismatch coincident with a low level in the No. 4 Steam Generator. These conditions were the result of an apparent transistor failure and blown fuse on a digital board in the feed flow signal controller for the Loop 4 Feedwater Regulating Valve (FRV). The failed signal controller caused the FRV to close, creating a steam flow/feed flow mismatch. The Control Room Operator attempted to take manual control of the FRV. A Reactor Trip occurred when a low level condition was created in No. 4 Steam Generator. Following the Reactor Trip all systems functioned as required, with the exception of the generator trip circuitry. The Main Generator failed to trip when a limit switch, associated with Turbine Control/Stop Valve-D did not make-up mechanically when the valve closed. The generator remained connected to

the grid for 128 seconds, until the generator was manually tripped. The defective FRV signal controller was replaced. The misaligned limit switch on Turbine Control/Stop Valve-D was repositioned for proper mechanical alignment. This event had no actual or potential impact on public health and safety.

END OF ABSTRACT

Conditions Prior to Occurrence

Unit 2 in Mode 1 (Power Operation), at 100 percent Rated Thermal Power and no unusual evolutions in progress.

Description of Event

On February 23, 1995 at 1645 hours, a Unit 2 Reactor Trip occurred. The Reactor Trip was the result of a reactor protection actuation from a steam flow/feed flow mismatch, coincident with a low level in No. 4 Steam Generator (EIIS/SB-SG). A feed flow controller (EIIS/JB-FC) associated with the Loop 4 Feedwater Regulating Valve (2-FRV-240) (EIIS/JB-FCV) failed as a result of an apparent transistor failure and blown fuse on a digital board. Valve 2-FRV-240 closed as a result of the feed flow controller failure. The Control Room Operator attempted to take manual control of 2-FRV-240, to increase the level in No. 4 Steam Generator, but the level in No. 4 Steam Generator had already decreased to the low level setpoint, which resulted in the Reactor Trip.

Following the trip, all systems functioned as required, with the exception of the Generator Trip System. The generator (EIIS/EL-GEN) failed to trip due to a malfunctioning limit switch (EIIS/IT-ZIS) on the Turbine Control/Stop Valve-D (CV-D) (EIIS/IT-FCV), and was manually tripped from the Control Room. as a result of the switch failure, the generator remained connected to the grid for 128 seconds. There were no over-voltage or over-current conditions recorded.

There were two equipment problems identified during the Reactor Trip:

- Failure of feed flow controller for 2-FRV-240
- Failure of Turbine Control/Stop Valve-D limit switch

The 2-FRV-240 feed flow controller failure was attributed to an apparent transistor failure and blown fuse on a digital board in the feed flow controller. The area around the failed transistor was discolored due to excessive heat. The remaining Unit 2 steam generator level controllers,

feed flow controllers, and the auto/manual stations are similar. These controllers were inspected for similar heat related problems. None of the inspected components had any indication of heat discoloration. This is the first failure of this type of component, which was installed as an equipment upgrade during the 1994 Refueling Outage.

Description of Event continued

The main generator failed to trip when Control/Stop Valve-D closed and the associated limit switch did not makeup mechanically. The circular disc on the valve stem of Control Valve-D did not make adequate contact with the limit switch and a closed position signal was not indicated. The generator trip circuity requires closed indication of all of the Main Turbine Stop/Control Valves and all six Reheat/Intercept Valves to actuate the Generator Trip Signal.

Cause of Event

The Reactor Trip was the result of an apparent transistor failure and blown fuse in the Feedwater controller for the No. 4 Steam Generator feedwater regulating valve. This caused the feedwater regulating valve to close, which created a steam flow/feed flow mismatch.. When the No. 4 Steam Generator low level alarm setpoint was reached, a Reactor Trip occurred.

Analysis of Event

This event is being reported per 10CFR50.73 (a)(2)(IV) as an event that resulted in automatic actuation of Engineered Safety Features, including the Reactor Protection System. This event was reported to the U. S. Nuclear Regulatory Commission Operations Center as a Four Hour Report, per 10 CFR 50.72(B).

A Reactor Trio occurred following failure of the control circuit for the Loop 2 Feedwater Regulating Valve. This created a Steam Flow/Feed Flow mismatch, coincident with a subsequent low level in the No. 4 Steam Generator. All control rods fully inserted. The turbine tripped as expected. The generator did not trip as expected due to a misaligned limit switch on Control Valve-D. The generator remained connected to the grid for 128 seconds after the Reactor Trip, when the generator was manually tripped. There was no adverse effect noted on the turbine or generator. There was no over-current or over-voltage conditions recorded.

Normal off-site power was available, the emergency diesel generators were in standby, and no safety equipment was out of service prior to the trip. All systems functioned as required with the exception of the Generator Trip System. This event did not have any actual or potential adverse impact on the health and safety of the public.

Corrective Actions

The defective signal controller for the Loop-4 Feedwater Regulating Valve was replaced. The remaining Unit 2 steam generator level controllers, feed flow controllers, and the auto/manual stations were inspected for indications of similar heat related problems. None of the controllers inspected had an indication of heat discoloration similar to that found in the Loop-4 feed flow controller.

The misaligned limit switch on Control Valve-D was repositioned for proper mechanical alignment.

Failed Component identification

Component Name: Feed Flow Controller for Loop-4 Feed Regula
ing Valve
(2-FRV-240)

Manufacturer: ABB Kent Taylor

Model: Part No. - 1701RZ10003C XL

EIIS Code: JB-FC

Previous Similar Events

None - this is the first event of this type.

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AEP

INDIANA
MICHIGAN
POWER

March 27, 1995

United States Nuclear Regulatory Commission
Document Control Desk
Rockville, Maryland 20852

Operating Licenses DPR-74
Docket No. 50-316

Document Control Manager:

In accordance with the criteria established by 10 CFR 50.73 entitled Licensee Event Report System, the following report is being submitted:

95-002-00

Sincerely,

A. A. Blind
Plant Manager

/mr

Attachment

c: J. B. Martin, Region III
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